

# Tangible bits

## Context

This paper is written by Hiroshii Ishii and Brygg Ullmer 15 years ago.

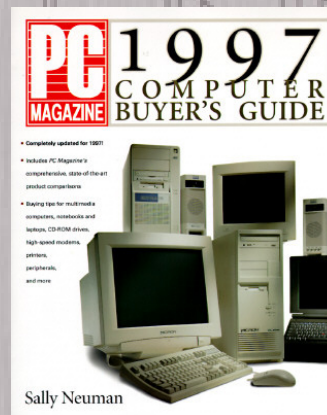
To give you a bit of context, That was the year Diana died; the spice girls were still rockin'; Titanic won, i think, every academy award, even the ones it wasn't nominated for; Tartan, hoodies and cut off jeans were cool; and Facebook was still just a sparkle in the Winklevosses' eyes.

## Tangible Media Group

The Paper outlines a manifesto of sorts of the TMG (Tangible Media Group). The TMG is a centre run from the MIT Media Lab. It is is still active as of this paper although Byrgg Ullmer has since left for Louisiana State University.

## Beliefs

The group feel that digital technologies have keep the separation of themselves from the physical world by interfacing through cold, repulsive beige objects such as traditional computers.



The Beige revolution  
*Cover PC Magazine. 1997 Computer Buyer/s Guide, 1997.*

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They have a certain romanticism to scientific equipment of the pre digital. They mourn the loss of the craft of technological instruments in the past, Instrument makers such as Pixii who made luxurious instruments out of mahogany, and brass. Ishii particularly mentions fond childhood memories of the click clack of his mother using a soroban (japanese abacus). He fondly remember's the tactility, its dual use as a handy massager as well as a musical instrument.

The Tangible Bits group believes that there is too much bias on output through the GUI rather than the input from the real world. The keyboard, the mouse, limit the potentials of cyberspace human interaction. The also believe that too much attention is paid to the foreground,



Cometarium, Benjamin Martin,  
[http://dssmhi1.fas.harvard.edu/eMuseumMedia/eMuseumFull/Animation\\_Cometarium.gif](http://dssmhi1.fas.harvard.edu/eMuseumMedia/eMuseumFull/Animation_Cometarium.gif)

## Aims

The TMG (Tangible Media Group) aim to recreate this sort of human tactility to digital interfaces. The lament the separation between cyberspace and reality, and believe there is opportunity to break down barriers, by creating seamless interfaces, blur the lines between input and output, but augmenting reality and creating intuitive ubiquitous computing that makes computing transparent, invisible.

## Implementation

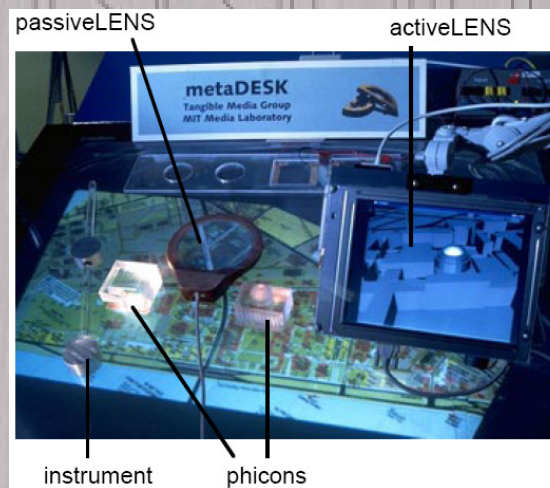
TMG are trying to create TUI's (Tangible User Interface) to replace the old method (GUI Graphical User Interface) of input and output.

The three main ways they are investigating to achieve this goal are:

- *interactive surfaces*,
- *coupling*,
- *ambient media*.

Interactive surfaces, can be any surface such as tabletops, ceilings, walls and floor, These become interfaces, input and output devices, sensing and displaying.

An example of this, is a Active workspace, they call the metaDESK. It's basically a physical imagining of a virtual desk. i.e. a real desktop modeled on a virtual desktop which is modeled on a real desktop. This is kind of a strange concept, and an interesting logic loop.



metaDesk Installation

[http://www.dfki.de/~kipp/seminar/folien/Martin\\_TUI/img/metadesk.png](http://www.dfki.de/~kipp/seminar/folien/Martin_TUI/img/metadesk.png)

Coupling is enhancing everyday tangible “graspable” objects such as books, cards and models with information that specific to them. They add to the MetaDesk objects that have data linked to them. The example they use are tiny models of MIT buildings that are used as a datum point for a virtual moving map. They call these models “phicons” (physical icons) when you move the phicon or rotate it the map moves and rotate with it. They were also investigating what happens when add another input such as another building.

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MIT 'Phicon'

<http://www.sigchi.org/chi97/proceedings/paper/hi-fg10.jpg>

Ambient media is looking at ways to infuse the surroundings with subtle stimulus, just at the periphery of human attention to create an almost unconscious yet more deeply immersive experience.



Ambient Ripple display`

[http://alumni.media.mit.edu/~ullmer/papers/tangible\\_bits/hi-fg17.jpg](http://alumni.media.mit.edu/~ullmer/papers/tangible_bits/hi-fg17.jpg)

An example they use to illustrate this, utilizes a speaker that simulates the sound of rain drops, this sound is then coupled to some active data, say website hits, that way if the website is busy the rain will sound heavy and if not, it wont be raining. The big benefit the group sees in this sort of interface is that it can be subconsciously ignored and comes to the the fore of human perception when something dramatic changes and it gains ones' attention. I.e. a massive spike in traffic would sound like a sudden downpour and would certainly gain the attention of the user, like wise a steep drop in traffic and consequent rain stopping would also gain the attention of the user.

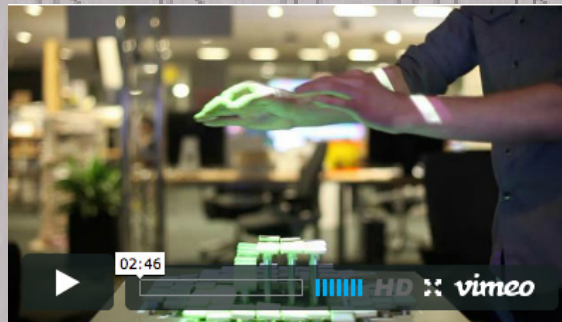
While most of this research may have seemed experimental in 1987. The seeds of lot contemporary paradigm shifting technology is evident in the TMG's research. Multi touch capacitive displays (as well as many gestures), kinect control, the ipad, QR codes, Microsoft Surface, google maps, and online collaborative tools.

## **NOW to the future**

I thought i should highlight some recent project to illustrate how the TMG aims have evolved in the last 15 years.

### *Recompose*

Recompose is a experiment in controlling an actuated surface, looks pretty cool, not sure of its uses.



Recompose from Matthew Blackshaw on Vimeo.  
<http://vimeo.com/20232335>

### *I/O brush*

This is a Brush that integrates a video camera into it. It acts input i.e as an eyedropper and captures an image/pattern, a color or a small snippet of video. The brush then acts as a output i.e. paints this onto a screen. The brush has bristles attached so that it feels land gives tactile feedback similar to a real brush. it is creates an especially interesting effect when it paints video, so the image create has a added temporal dimension.



I/O Brush

[http://web.media.mit.edu/~kimiko/iobrush/images/iobrush\\_collection.jpg](http://web.media.mit.edu/~kimiko/iobrush/images/iobrush_collection.jpg)

## Ping Pong Plus Plus

This is a Pingpong table with an interactive surface. The projection and audio react to the ball as it bounces on the table. There is also a kiosk so users can create their own visualisation using pre-prepared templates. This is kinda cool too, you can play it at the media Lag in the atrium. although it's usually pretty busy.



Ping Pong Plus by Ishii, Wisneski, Orbanes, Chun & Paradiso

<http://www.youtube.com/watch?v=AZO8sfmpKIQ>

## Conclusion

As this paper is 15 years old, it is interesting to see that some of the groups "wild" ideas of tangible interfaces have come to fruition. The iPad being the most obvious, but some of the more subtle technologies, like surround sound becoming ubiquitous, force feedback controllers, and the Wii are great examples of commercially successful applications.

I also want to pause for a moment and reflect on the what was happening in society at the time and what societies relationship with this type of technology was. At the same time Tangible Media Group was investigation ways to create human technology interfaces, society was repelling that as a concept. Although the conversation was very different in a specific way, The TMG talked of augmenting space, but society was contemplating augmenting humans directly. Humans have a long history of using technology to enhance their intellect, but rarely their bodies. In the rare cases we do it is usually only to augment a lost "natural" function such as bi-focal glasses, prothesis etc... or ironically we don't seem to mind when it is for purely cosmetic reasons.

I think contemplating the difference between augmented space and augmented bodies is interesting as well as reflecting on what it is that repels us from augmenting our bodies, why does it cause such extreme societal reactions such as the videos i want to show you.



eXistenz clip 1 Director David Cronenberg 1989



eXistenz clip2 Director David Cronenberg 1989

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Testsuo - The Iron Man, Directed by Shinya Tsukamoto 1989

### Questions and Challenges:

*Why do you think this tangible technology has had such a slow uptake?*

*Why are willing to augment our minds using technology but not our bodies?*

*What happens to us when that boundary is blurred?*

*I was interrupted by 'ambient' media at least 50 times while preparing this discussion it would have taken me hours to find all the things that beep, vibrate and tweet in the house, when does "ambient" media cross the line into the negative.*

*What if we become so reliant on technology that we can't survive without it?*

*Is technology self-interested?*

### Documentation of Class Discussions and Responses to Questions and Challenges:

I think everyone was a little grossed out by the videos. They were pretty confronting.

Catherine suggested that we are more happy to augment our bodies through chemicals and biological manipulation. I.e steroids. This was interesting, perhaps it's because it is not manifested physically as such. It does it's work out of site out of mind.

There was talk about Post-Human, and that looks like a path for further research. Particularly writing by Katherine Hayles.

We also talked a little on AI and someone suggested reading Andy Clark, Being There: Putting Brain, Body, and World Together Again.

I mentioned a Kickstarter project that used smell as an interface and thought it interesting that it was an unsuccessful project.

There was also a lot of talk about change, and our resistance to it.

World of Warcraft was mentioned as an immersive virtual environment Particularly the replication of social systems, and group control mechanisms.